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We understand that the sub-section of *Microscopy*, so well started at the Salem meeting, and developed at Troy, will be well represented at the next meeting, and we beg to suggest to the Local Committee the importance of providing a room with proper light and substantial tables for the use of this sub-section, and a safe place for the deposit of the instruments that undoubtedly will be taken to the meeting if members are notified in the general circular that such arrangements have been made.

We also trust that some change will be made by the Association in relation to the Proceedings on the first day, and the time of delivery of the President's address, which certainly should come off before he resigns the chair to his successor, and there seems no more appropriate time for the delivery of the address than the first evening, which it would be well to have permanently allotted to this purpose by vote of the Association. The organization of the meetings of the Association could be very much facilitated by a complete change of the present irregular and confusing mode of proceeding, and we trust the next meeting will inaugurate a decided change in this respect.

Members will remember that the titles of their papers must be sent in advance to the *Permanent* Secretary.

In this connection we call attention to a circular, which has been mailed to the address of every member from the office of the NATURALIST, in relation to the early publication of the papers to be read at the meeting, and to request any person, who has not received a copy and who intends to read a paper in any of the Natural History Sections, to send to the office of the AMERICAN NATURALIST for one.

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GEOLOGY.

SOME PHYSICAL FEATURES OF THE APPALACHIAN SYSTEM AND THE ATLANTIC COAST OF THE UNITED STATES, ESPECIALLY NEAR CAPE HATTERAS. — At the meeting, February 1st., of the Boston Society of Natural History, Professor N. S. Shaler gave an account of the coast line in the neighborhood of Cape Hatteras and the Chesapeake Bay. He thought it important in view of the Zoological as well as the physical history of the continent, to determine the causes which had given the existing form to the shore line of this continent. The coast between the Rio Grande and the Chesapeake, presents but two considerable prominences. The first, that of Florida, is probably entirely the product of organic life, and as such, probably the most considerable geographical feature on our earth's surface the product of that agent alone. Cape Hatteras, however, cannot be regarded as in any way the result of reef building animals, though it has been suggested that possibly the banks so like the reefs of Florida, may rest upon ancient coral deposits. Sections through the reefs show that they are built on clay bottoms. The Delaware and Chesapeake bays may be, in part, at least, accounted for by supposing that the vast ice streams which during the glacial period passed down the main rivers which lead into them, just as they poured down the Hudson and the Connecticut, had eroded the soft rocks upon which they descended from the harder rocks of the Appalachian Mountains just as the streams of the Rhone and Rhine had cut away the soft rocks making the lake basins of Geneva and Constance. We cannot, however, in this way account for the formation of Pamlico and Albemarle sounds, though the mud and sands which form the outlying banks are probably derived from the excavation of the Chesapeake, just as the similar deposits, which enclose the broad water of the peninsula of Eastern Virginia, are derived from the excavation of the Delaware Bay.

It is likely that the promontory of Cape Hatteras is the result of the elevation of an outlying ridge of the Appalachians near Richmond, Virginia. At that point there is a ridge of syenite appearing from beneath the tertiary clays. This ridge clefts to the east; beneath the clays to the north, is similarly hidden, but, towards the south, extends as far as near Weldon, where it may give place to other similar ridges which continue the elevation to the southward. The height of this ridge can be ascertained by following it to the westward, where we find it sinking beneath the coal, the syenite lying more than a thousand feet deep, at a distance of ten miles from the summit. So we see that Richmond is on a mountain one thousand feet or more high, though covered by subsequent accumulations after having been much eroded. The mining sections through the beds of the Liassic coal field give us the best of evidence on this point. This ridge is parallel to the Alleghanies, and must be regarded as part of that system. We must modify our theory of the elevation of the Appalachian chain, so as to admit that, instead of having been altogether the product of forces acting during and just after the carboniferous time alone, this elevation continued to go on until after the formation of the Liassic rocks of the Richmond coal field which are much disturbed by the elevation of the syenite ridge to the eastward. While the Appalachians have this comparatively recent outline to the eastward, they have an ancient ridge in a comparable position about as far to the westward. The Cincinnati and Nashville Silurian domes are only the highest points of a low ridge which was elevated on a position parallel to the subsequently created Appalachian system. This ridge was elevated as early as the period of the Calciferous sand rock. This is proven by the traces of beaches and broken shells in beds of the Hudson River Period, and by the existence of great deposits of salt in the Calciferous sand rock which could only have been formed when that rock was out of water. We have, in this ridge, the first of the folds of the Appalachian system, which built continually towards the eastward.

The Hatteras projection was due to the elevation of the Richmond element of the Appalachians. The border tertiary rocks were thrown up and have resisted the wearing action about Hatteras. This ridge was possibly of the same age as the Connecticut River dislocations of the Tom and Holyoke series, and of the Martha's Vineyard series, to which it is approximately parallel.

The history of the Appalachian chain showed that they, like most mountains, tended to grow by successive parallel additions. Mountains are characteristically shore phenomena, rarely being developed away from that line.

The character of the topography changes materially south of Weldon. Its character cannot be explained by the ordinary atmospheric influences. The soundings also afford similar indications. The topography near the coast is purely submarine, as formed by the action of the sea. Passing inland, the evidences of the action of the atmospheric agents appear. He thought the whole of this shore indicated a recent origin, an emergence and a slight sinking within the period of man's remembrance. There had been in the most recent geological period a rising and sinking of the coast, as at Charleston, of fifty or sixty feet; Maine, two hundred feet; and greater on the coast of Labrador, as Dr. Packard has shown. These alternations of sinking and elevation could be accounted for by supposing that the sea flows in their central regions, more constantly sinking the land areas, rising when the pivot point of this rotation was at the shore, the sinking of sea bottom and rising of the land could go on without changing the position of the shore line; if, however, this pivot point were to the seaward of the shore, the movement would cause the land to gain on the sea; if the pivot point were to the landward of the shore, the sea would seem to gain.

He spoke of the great influence which Hatteras had exerted in deflecting the Gulf Stream from its course.

Dr. C. T. Jackson said that the syenite at Richmond, Virginia, must have been elevated in a cold state; there was no evidence of its having interpenetrated the coal measures. He agreed with Professor Shaler in regard to the elevation of the coast, the pivot point being in Virginia. In Carolina a cannon placed in one of the streets is now under water. In the eastern parts of the State of Maine fishermen had noticed what they call the growth of rocks; those which, within their recollection, were submarine, now appearing above the surface.

Mr. Shaler referred to Mr. Heinrichs, who was now working in the coal measures at Richmond, and hoping soon to get down to the the syenite. He expected valuable results from the investigations.

Mr. J. B. Perry said, in regard to the syenite underlying the coal, that there was no evidence of intrusion. The syenite was in existence before the coal was laid down. In regard to the formation of the coast, he alluded to the observations of Elie de Beaumont, that the elevations of a particular period were parallel. The oldest uplifting, that on the west of Hudson's Bay in N. N. W. and S. S. E. direction, called in Europe the elevation of Finisterre, is earlier than the Laurentian, and crosses it. Suppose there were such an elevation under the surface of the water, corals would form upon that ridge, and an easy explanation is afforded of the extension of Florida in this direction. Supposing parallel elevations, another might have had a bearing upon Hatteras. He was satisfied that Martha's Vineyard was elevated at the close of the Pliocene period. Mount Etna was elevated at the same time.

The earlier elevations of the Alleghanies occurred during the Longmynd period, at the end of the Silurian period. The axis of Cincinnati was the beginning of this uplifting.

He had studied the coal measures in the neighborhood of Richmond, and differed from the general conclusions in regard to them. Some of the fish from Virginia, New Jersey, and the Connecticut valley, are identical, and have a character intermediate between those of the Permian and the Jurassic. The same formation extends from South Carolina to Nova Scotia. The character of the fossiliferous portion of the Connecticut valley shows it clearly to be Triassic. The Permian was a cold period. The Triassic, a warm period, followed. He thought it was neither Permian nor Jurassic, as many supposed, but Triassic.

Mr. W. H. Niles said the question which Professor Shaler had brought forward was one of great interest. He objected to the view taken by Mr. Perry of the formation of Florida and Hatteras. Professor Shaler's view, he said, was consistent with all the physical features of our Eastern coast. The deepest portion of the sea bed lies opposite the highest mountains, showing a parallelism between the Atlantic valley and the Appalachian system. The Cincinnati axis, he said, was instructive because showing that all parallel chains were not raised at the same time. The long terrace of the Atlantic plain forms another parallel. The streams also conform. The depositions are parallel with the mountain chains. He accepted Professor Shaler's explanation of the elevation and depression of land in connection with water deposition.

Mr. Perry remarked that when one line of upheaval crosses another, it will be modified; and a very old one will be largely disguised, yet may have had its effects and been a condition, as in Florida, affording ground for the corals to work.

Mr. Hyatt remarked, that besides the general westerly and easterly motion described by Professor Shaler, there were evidences of a motion transverse to this along the coasts. Thus the north of Greenland, as shown by various arctic explorations, has beaches recently elevated; and historical records, as well as direct observations, have proved that the south of Greenland is sinking. Dr. Packard's observations in Labrador give the evidence of a comparatively recent elevation, probably still going on. Farther south, at the Mingan Islands, the speaker had observed a series of beaches, the lowest of which remained near high-tide mark. On the Island of Anticosti the remains of fresh-water shells were found, which had apparently died from the influx of tide-water into the little estuary, or mouth of a brook, where the water had formerly been fresh. There were two cliffs stretching around the southern shore of this island, each about fifty feet high. The present sea level, however, at high tide, now reached the foot of the inner cliff, overflowing the outer cliff to the depth of two or three feet or more, in different localities. The shores of Nova Scotia, according to the observations of Professor Marsh and others, were, if the speaker remembered rightly, sinking. The shores of Maine, as shown by Dr. C. T. Jackson, Dr. Packard and others, were rising. At Marblehead Neck he had observed a water-worn cliff elevated eight or ten feet above high-water mark, and protected by a ridge of shingle, which forms the back of the present beach. This beach now intervenes between the cliff and the water's edge, which is between thirty and forty feet distant.

Observations made by the Coast Survey show that the coast in Long Island Sound and southward in New Jersey has been sinking. The formation of Florida Keys shows that that state is rising. These and other facts which proper investigation would undoubtedly bring to light, indicate a series, or perhaps many series, of transverse waves of elevation and subsidence running down the coast at right angles to the direction of the great waves which elevated the Appalachians.

Mr. Niles showed that from the earliest times, in the Adirondacks, and at different points southerly, there had been peninsulas corresponding in position with Florida, which was the most southern and latest.

NATURAL HISTORY OF DEEP-SEA SOUNDINGS BETWEEN GALLE AND JAVA, BY CAPTAIN CHIMMO. — The ooze dredged up from a depth of two thousand three hundred fathoms, where the temperature was found to be 35° F., consisted to the extent of ninety per cent. of organic matter, Foraminifera, chiefly Globigerinæ, together with Polycistinæ, with a few broken sponge-spicules. In the shallow water near Sumatra, the animal life has decreased to only about five per cent. of the ooze, the Globigerinæ having entirely disappeared. The water brought up from great depths was found to contain a large proportion of salts in solution, which crystallized out immediately on exposure to the air. Mr. Busk remarked on the great interest and importance of the observation of the low temperature of the deep water in a latitude within a few degrees of the equator, strongly confirming the conclusions as to a general circulation of the water between the equator and the poles drawn from similar observations in the Atlantic. — *Nature.*

DISAPPEARANCE OF AURORA ISLAND. — Referring to the statement of the disappearance of Aurora Island (one of the New Hebrides group), recently printed in the newspapers, Mr. Tryon exhibited to the Conchological Section of the Academy of Natural Sciences of Philadelphia, at their meeting January 5th, 1871, two species of shells from the collection, supposed to be peculiar to this island, remarking that in the event of the reported submergence of the island being confirmed, these must be classed among the lost species. In his report on the mollusca collected by Wilkes's U. S. Exploring Expedition, Dr. Gould gives the following account of Aurora Island: —

> "The little island of Metia, or Aurora Island, to the northeastward of Tahiti, is one of peculiar interest. It is a coral island which has been elevated two hundred and fifty feet or more, and has no other high island near it. On it were found four small land shells belonging to three genera, viz.:—*Helix pertenuis*, *Helix Dœdalea*, *Partula pusilla* and *Helicina trochlea.* None of these were found upon any other island. They seem to have originated there, after the elevation of the island, and have a significant bearing upon the question of local and periodical creations in comparatively modern times."

GEOGRAPHY OF THE SEA BED. — At the meeting of the Royal Geographical Society, held on Nov. 29, a paper was read "On the Geography of the Sea Bed," by Capt. Sherard Osborn, R. N. The author gave an account of our present knowledge of the configuration of the bed of the ocean, as derived from Admiralty surveys and submarine telegraph expeditions during the last fifteen years. His explanations were illustrated by a number of diagrams showing sections of the North Atlantic and other oceans. It has been definitely ascertained that the greatest depth of the ocean does not reach 3,000 fathoms in any part where telegraphic lines have been laid. The bed of the North Atlantic consists of two valleys, the eastern extending from 10° to 30°, the western from 30° to 50° West Longitude. The extreme depth of the eastern valley is under 13,000 feet, which is less than the altitude of Monte Rosa. This valley has been traced southward to the equator. It is separated from the western valley by a ridge in 30° West Longitude, in which the average depth is only 1,600 fathoms. This ridge terminates to the north in Iceland, and southward at the Azores, so that it is volcanic in its character at both extremities. Its extreme breadth appears to be under 300 miles, and the Atlantic deepens from it on both sides. Explorations carried on in the Mediterranean, the Red Sea, and the Indian Ocean, showed similar uniformity in the level of the sea bottom; and the general conclusions arrived at by Capt. Osborn were, that in the deep sea there is an absence of bare rock, and that there are no rough ridges, canons or abrupt chasms; moreover, that the bed of the deep sea is not affected by currents or streams, even by those of such magnitude as the Gulf Stream; but that it rather resembles the prairies or pampas of the American continent, and is everywhere covered with a sort of ooze or mud, the *dèbris* of the lower forms of organic life.

Colossal Fossil Sea-Weed.—From the microscopic examination of the structure of specimens of the fossil trunks described under the name of *Prototaxites Logani*, and which Principal Dawson affirmed in his Bakerian lecture before the Royal Society, to be the oldest known instance of Coniferous wood, Mr. Carruthers has discovered that they are really the stems of huge Algæ, belonging to at least more than one genus. They are very gigantic when contrasted with the ordinary Algæ of our existing seas, nevertheless some approach to them in size is made in the huge and tree-like Lessonias which Dr. Hooker found in the Antarctic seas, and which have stems about twenty feet high, and with a diameter so great that they have been collected by mariners in these regions for fuel, under the belief that they were drift-wood. They are as thick as a man's thigh.—*The Academy.*

MICROSCOPY.

Improvements in the Lenses of Microscopes.—For some time, people in England have been content to let the improvement of the optical powers of the microscope remain entirely in the hands of the makers, believing, apparently, that Mr. Lister had effected all in his suggestions and improvements that could be desired. Dr. Royston Pigott, an able mathematician, formerly fellow of St. Peter's College, Cambridge, and a Doctor of Medicine of that University, was not, however, inclined to look at the matter in this way, and for many years has been working and experimenting with a view, first, to test the accuracy of our best object-glasses, and, secondly, to suggest means for their improvement. It should be remembered that Oberhauser, Nachet, and especially Hart-